

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

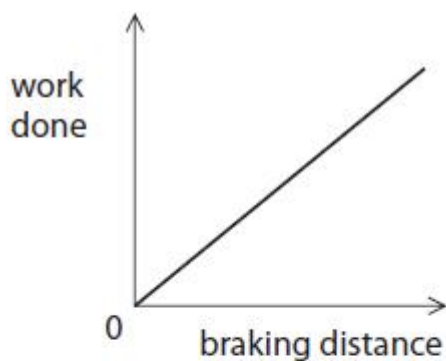
Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

The work done to bring a car to rest is given by the equation

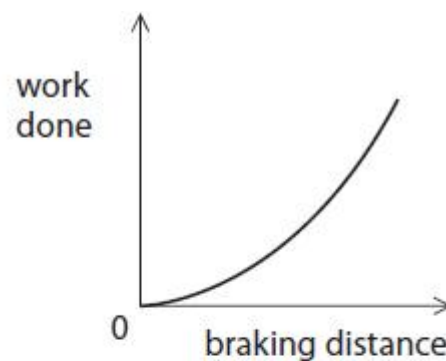
$$\text{work done} = \text{braking force} \times \text{braking distance}$$

Which of these graphs is correct for the car if a constant braking force is applied?

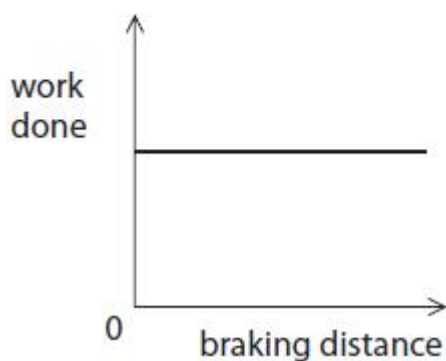
(1)



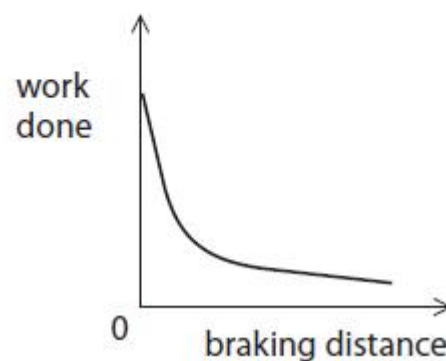
A



B



C



D

(Total for question = 1 mark)

Q2.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

Figure 7 shows a submarine being propelled forward underwater.

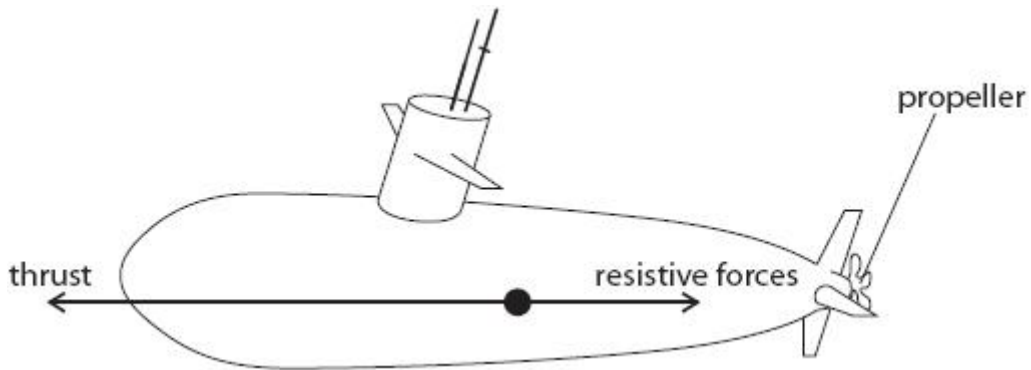


Figure 7

The thrust and the resistive forces are represented in magnitude and direction by the arrows in Figure 7.

(i) Which one of the following is correct?

(1)

- A The submarine is speeding up.
- B The submarine is slowing down.
- C The submarine is moving at a constant speed.
- D The submarine is moving at a constant velocity.

(ii) The propeller forces water away from the back of the submarine.

Explain why this produces a thrust in the forward direction.

(2)

.....

.....

.....

.....

(iii) For a submarine to come to a standstill, its engines are put in reverse.

The propeller then runs in a reverse direction, producing a force causing the submarine to decelerate. It takes many minutes to come to rest.

Explain, using Newton's second law, why it takes many minutes for the submarine to slow down and come to a standstill.

(2)

.....

.....

.....

.....

(Total for question = 5 marks)

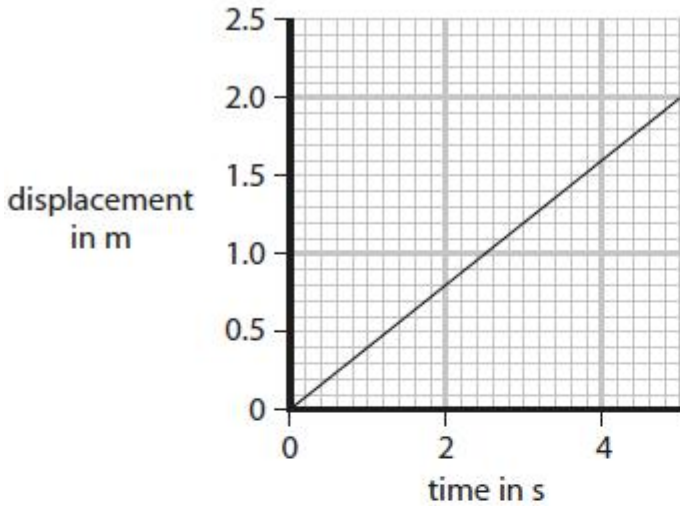
Q3.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

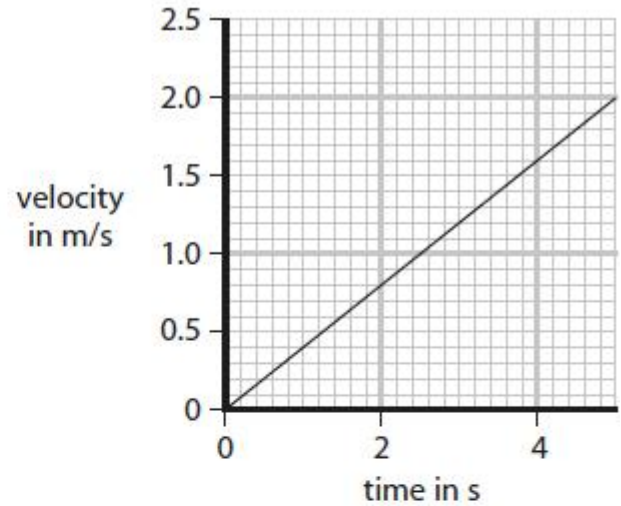
Which of these graphs represents an object moving with a constant velocity of 2 m/s?

(1)

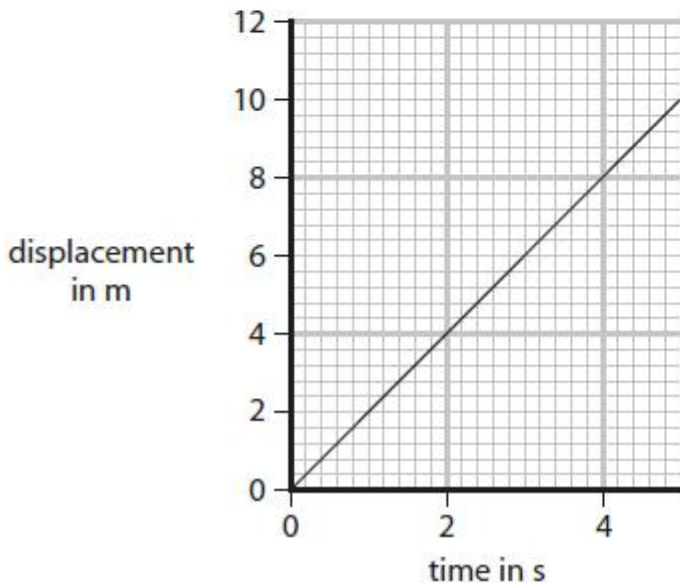
A



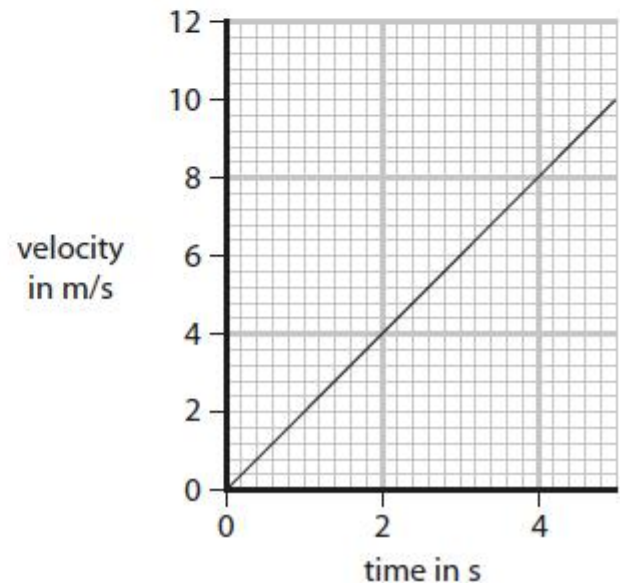
B



C



D



(Total for question = 1 mark)

Q4.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

Figure 8 is a velocity/time graph for a lift moving upwards in a tall building.

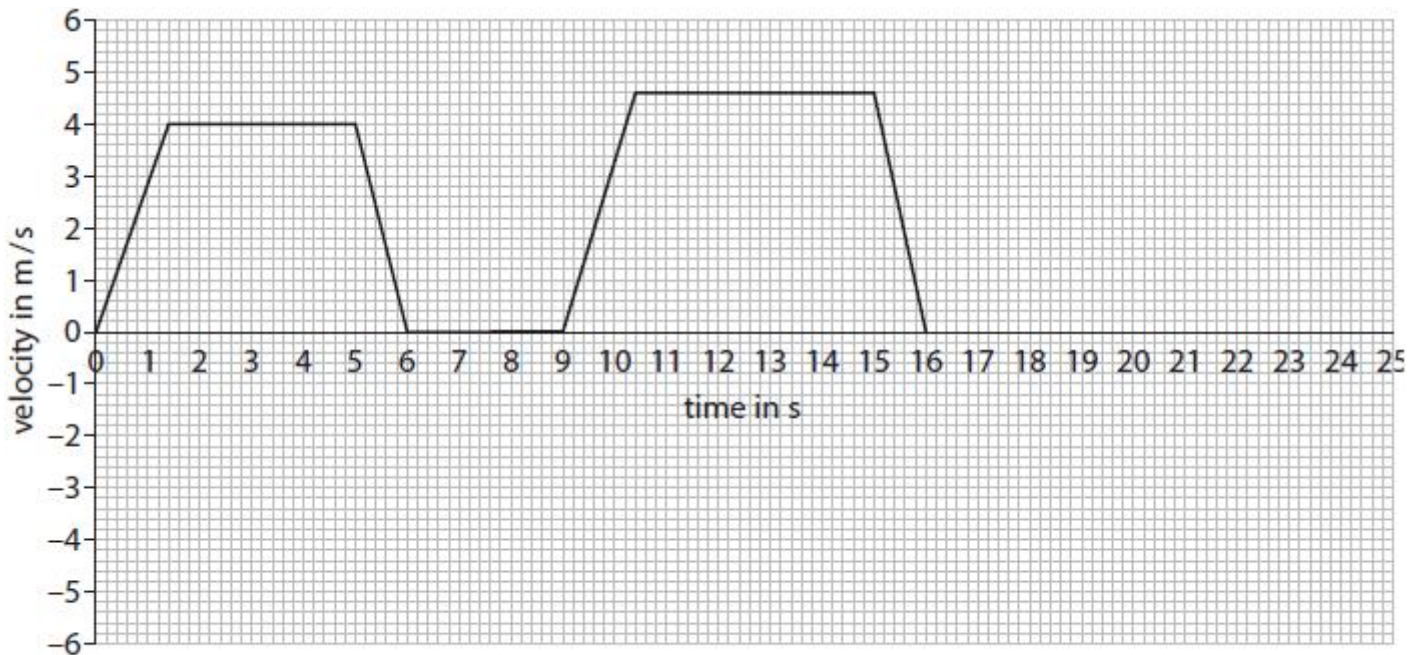


Figure 8

For what length of time is the lift at rest during the first 16 s?

(1)

- A 1.4 s
- B 3.0 s
- C 3.6 s
- D 4.0 s

(Total for question = 1 mark)

Q5.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

Which of these is a scalar quantity?

(1)

- A acceleration
- B distance
- C force
- D weight

(Total for question = 1 mark)

Q6.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

(1)

- A energy
- B force
- C mass
- D work

(Total for question = 1 mark)

Q7.

Explain **one** way the students could improve their procedure to obtain a more accurate value for g .

(2)

.....

.....

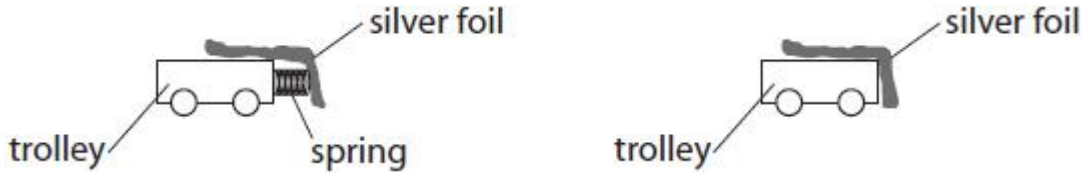
.....

.....

(Total for question = 2 marks)

Q8.

A student investigates the effect of a crumple zone on the force exerted during a collision. The student has one trolley with a spring at the front and another trolley without a spring.



The student uses the arrangement in Figure 13.

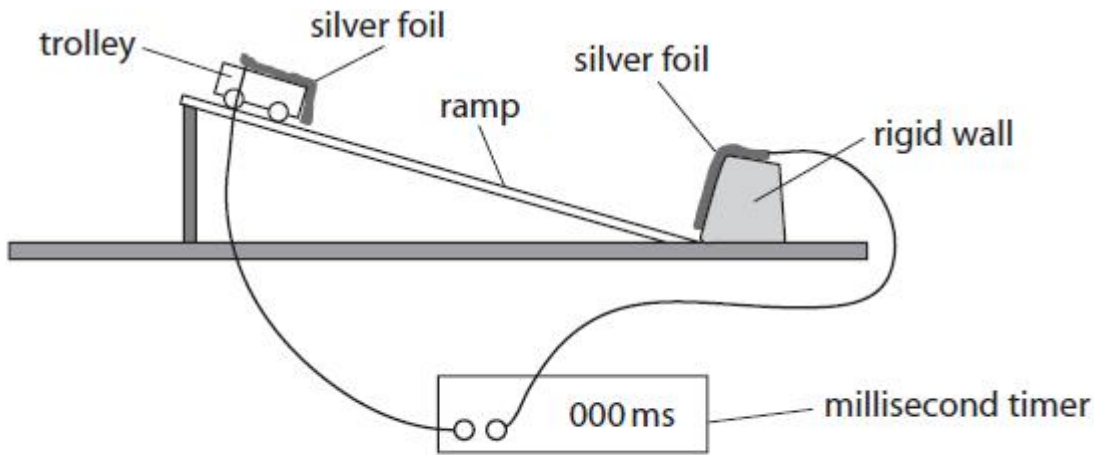


Figure 13

After a trolley is released, it accelerates down a slope and bounces off a rigid wall.

The speed of a trolley can be measured just before a collision with the wall and just after a collision with the wall.

The silver foils are connected to a millisecond timer.

The silver foils make contact with each other during the collision, so the time they are in contact can be read from the millisecond timer.

Explain how the student could investigate the effect of a crumple zone on the average force exerted during the collision.

Your explanation should include:

- how to determine the force (you may wish to refer to an equation from the list of equations at the end of this paper)
- how the effect of crumple zones may be shown in the investigation
- precautions that may be necessary to achieve accurate results. (6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

